

## REMARKS

Claims 1 through 3, 6 through 20, 23 through 31, 34 through 37 and 39 through 41 are currently pending in the application.

Claims 8 through 11 have been canceled to eliminate redundancy.

This amendment is in response to the Final Office Action of May 6, 2003 and the Advisory Action of July 15, 2003.

Claims 1 through 3, 6 through 11, 16 through 20, 23 through 31, 34 through 37 and 41 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ochiai et al. (U.S. Patent 5,643,831).

Claims 12 through 15, 39 and 40 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ochiai et al. (U.S. Patent 5,643,831) as applied to claims 1 through 3, 6 through 11, 16 through 20, 23 through 31, 34 through 37 and 41 above, and further in view of Bolstad (U.S. Patent 2,979,773).

Applicant submits that to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure.

With regard to the rejection the rejection of claims 1 through 3, 6 through 20, 23 through 31, 34 through 37 and 41 under 35 U.S.C. § 103 as unpatentable over Ochiai in view of knowledge available to one skilled in the art, Applicant respectfully submits that such a rejection does not and cannot establish a *prima facie* case of obviousness under 35 U.S.C. § 103 because such a proposed combination of the cited prior art fails to meet the all f the above criteria. Further, when asserted that the general knowledge of the prior art is relied upon in any rejection to negate patentability that knowledge must be articulated and placed on the record. Conclusive statements cannot be relied upon when dealing with particular prior art and specific claims, but, rather, the specific rational upon which is being relied must be set forth. *In re Lee*, 61 USPQ2d 1430.

In the present instance, Applicant submits that the cited prior art contains no suggestion or teaching whatsoever regarding any modification thereof, nor has any specific knowledge available in the prior art been set forth regarding any modification of the Ochiai et al. reference regarding the claimed or presently claimed invention. Additionally, there can be no showing of any success regarding the modification of the Ochiai et al. reference regarding the claimed or presently claimed invention because any such showing is mere speculation regarding the cited prior art. Similarly, the cited prior art of record does not teach or suggest all the claim limitations of the presently claimed invention. Further, any rejection of the presently claimed invention based upon the cited prior art of record would be a hindsight reconstruction of the presently claimed invention base solely upon Applicant's disclosure, not the cited prior art of record because the cited prior art does not teach or suggest all the claim limitations of the presently claimed inventions.

Additionally, with respect to claims 1, 18 and 29, there is no suggestion or teaching in Ochiai to combine the solder ball mold of Ochiai with variously-shaped cavities (trapezoidal hemispherical, rectangular and square) which, it is asserted, are known in the art but no specific knowledge has been made available for such an assertion. Additionally, the knowledge available to one skilled in the art would not suggest the combination. In fact, the mold-forming process disclosed in Ochiai is not compatible with cavities that have trapezoidal, hemispherical, rectangular and square cross sections. The reason is that Ochiai etches a surface having a particular crystallographic orientation (the  $\langle 110 \rangle$  plane) which is conducive to the etching of essentially identical wedge-shaped cavities if identical parallelogram-shaped areas of the surface are subjected to etching. Summary of the Invention at Col. 2, lines 62-67; Col. 3, lines 1-20. The wedge-shaped cavity and its associated volume are consequences of the crystallographic orientation of the surface, the parallelogram-shaped exposure areas, and the side dimensions of the parallelogram. Col. 6, lines 63-67; Col. 7, 1-20. The reference suggests or teaches only wedge-shaped cavities. It does not suggest or teach other shapes. Given the proclivity for the surface of Ochiai to form cavities of a specific shape upon exposure to etchants, as well as the relationship of the shape of the exposed surface to the shape of the cavity, it cannot be assumed that methods taught in Ochiai can be used to fabricate a mold with cavity cross sectional shapes

different from the wedge-shape specifically taught by Ochiai. In fact, one skilled in the art would recognize that because of the crystallographic orientation of the surface used in Ochiai, the formation of cavity cross sections in shapes other than wedge-shaped would, in all likelihood, be difficult because the surface is in a crystal plane which affects the cavity shape. Thus, Ochiai teaches away from and does not suggest the proposed combination of cited prior art. It should be noted that Figures 14A-14C do not demonstrate cavities with hemispherical cross sections. They are in fact partially formed wedge-shaped cavities. Col. 7, lines 21-36. They have a basin-shaped profile, i.e., are longer than they are deep. The tendency of the surface to form wedge-shaped cavities prevents the cavities from attaining a hemispherical profile.

Accordingly, Ochiai in combination with the cited prior art cannot and does not *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed invention.

Still further, there is little expectation of success. As set forth above, Ochiai, at best, suggests or teaches the etching of a specific crystallographic plane in order to obtain wedge shaped cavities. Because of the effect of the crystallographic orientation of the surface plane, the methods taught by Ochiai are at least uncertain, if not unlikely to easily produce other types of cross sections because of the tying of the cavity shape to one specific crystal plane orientation.

Accordingly, Ochiai in combination with any cited prior art does not and cannot *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed invention. Therefore, Applicant respectfully submits that claims 1, 18 and 29 are allowable for the reasons set forth above regarding the cited prior art failing to *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed invention, and 2, 3, 6, 7, 16, 17, 19, 20, 23 through 27, 29 through 31, 34 through 37 and 41 are allowable as depending from allowable claims.

Yet further, the Ochiai et al. reference does not teach or suggest all the claim limitations of the presently claimed inventions of amended independent claims 1, 18, and 29 to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed invention. For instance, the Ochiai et al. reference does not teach or suggest or any combination of the cited prior art and the knowledge of within the prior art such claim limitations calling for “a substrate having a substantially flat planar surface”, “at least one cavity formed in said surface of said substrate, said cavity having -substantially the same dimensions as the at least one metal bump,

said at least one cavity having a shape of one of a trapezoidal shape, a hemispherical shape, rectangular shape, and a square shape for forming a first shape of the solder paste when the substrate is heated which substantially conforms to the shape of the solder paste to the cavity for transfer to said secondary substrate substantially in the shape of the at least one cavity and a second shape when reheated for the reflow thereof for substantially drawing into a spherical shape held together by the surface tension of the solder material to form an approximately spherically shaped solder ball on a bond pad of said bond pads of said secondary substrate”, and “a nonstick minimally wettable release layer applied to said at least one cavity for minimizing the wetting of solder paste on the substrate during heating thereof from the heating of the substrate”.

At best, the Ochiai et al reference teaches or suggests the formation of a solder ball in a cavity having the shape of a rhombus. Such are not the presently claimed inventions setting forth specific claim limitations in the presently claimed invention not taught or suggested in the prior art. Applicant’s presently claimed inventions do not form a solder ball in the cavity of the substrate such as is taught and suggested by the cited prior art. Applicant’s presently claimed inventions are specifically directed away from any such substrate.

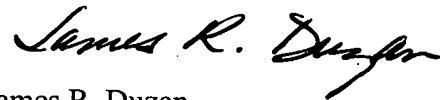
Applicant submits that any rejection of the presently claimed inventions of amended independent claims 1, 18, and 29 on the cited prior art of record would be a hindsight reconstruction of the presently claimed invention based solely upon Applicant’s disclosure not the cited prior art because the cited prior art of record contains no showings, teachings or suggestions regarding the claim limitations of the presently claimed inventions of amended independent claims 1, 18, and 29. Such a rejection is neither within the ambit nor purview of 35 U.S.C. § 103 and, clearly improper.

With respect to the rejection of claims 12 through 15, 39 and 40 under 35 U.S.C. § 103(a) as being unpatentable over Ochiai et al. as applied to claims 1 through 3, 6 through 11, 16 through 20, 23 through 31, 34 through 37 and 41 above, and further in view of Bolstad, Applicant respectfully submits that claims 12 through 15, 39 and 40 are allowable in light of the foregoing arguments pertaining to the applicability of Ochiai failing to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed invention.

Applicant submits that claims 1 through 3, 6, 7, 12 through 20, 23 through 31, 34 through 37 and 39 through 41 are clearly allowable over the cited prior art of record in the application.

In summary, Applicant requests the entry of this amendment, the allowance of claims 1 through 3, 6, 7, 12 through 20, 23 through 31, 34 through 37 and 39 through 41, and the case passed for issue.

Respectfully submitted,



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